Overview

This bulletin specifically covers the application of 3M recommended films to watercraft. For the purposes of this bulletin, “watercraft” is defined as those vehicles intended for personal pleasure such as motorboats, sailing boats, catboats, yachts, jetskis, runabouts and speedboats having aluminum and/or smooth fiberglass/gel coat bodies excluding industry regulated vessels. This definition specifically does NOT include any boats used in connection with commercial or business enterprises. 3M specifically excludes all other recreational vehicles from this definition.

Obtain and use the most current supporting product and instruction bulletins referenced in this bulletin. Make sure each installer reads and understands this bulletin before beginning a watercraft application. Consult the local 3M Technical Service with questions about approved product combinations that comply with industry regulations.

Table of Contents

Pre-Installation Information

NOTE

All graphics must be applied above the static water line. Graphics applied below the static water line are not warranted or recommended.

NOTE

All cut seams and edges must be edge sealed or taped.

Pre-installation Inspection Record Information

3M requires installers to complete a properly executed and signed pre-installation inspection record before applying any 3M graphics. This record, which identifies any potential problem areas, is mandatory for any warranty claims. Fill out a copy of the appropriate pre-installation inspection record for every watercraft. The form is located at the end of this bulletin.

3M recommends that graphic manufacturers clearly define mutual obligations between the watercraft owner/operator and themselves and strongly suggests that graphic manufacturers seek written limitations of claims or liabilities on individual watercraft for unsound paint.

Do NOT apply film to these surfaces.

- **Textured plastic substrates.** 3M does NOT warrant the application of film to textured plastic substrates under any circumstances.
- **Substrates with a poor bond between paint and boat.** Substrates with multiple layers of paint may be even more susceptible to areas with unsound paint. 3M does NOT warrant graphics applied to unsound paint.
- **Rubber, silicone, or flexible plastics.** The recommended films’ adhesives do NOT adhere to these materials.

Interior Film Applications

It is the end user’s responsibility to select appropriate films for their installation which conform to the region’s regulations (if applicable). Use of films for watercraft applications is strictly on a user test-and-approve basis.

See the 3M™ Fasara™ & 3M™ DI-NOC™ Glass Finishes Installation Guide and the 3M™ DI-NOC™ Architectural Finishes Installation Guide for details.

Compatible Products*

* Product availability varies by region. Contact a local sales representative or application engineer for details.

Recommended Films

- 3M™ Controltac™ Graphic Film 180mC
- 3M™ Scotchcal™ Opaque Graphic Film Series 100
- 3M™ Wrap Film Series 1080
- 3M™ Wrap Film Series 2080
- 3M™ Scotchcal™ ElectroCut™ Graphic Film 7125
- 3M™ Scotchcal™ ElectroCut™ Graphic Film 7725
- 3M™ Scotchlite™ Reflective Graphic Film 680
- 3M™ Scotchlite™ Reflective Graphic Film 680CR
- 3M™ Print Wrap Film IJ175Cv3
- 3M™ Controltac™ Graphic Film IJ180-10
- 3M™ Controltac™ Graphic Film with Comply™ v3 Adhesive IJ180Cv3-10
- 3M™ Print Wrap Film IJ180mC-10
- 3M™ Print Wrap Film IJ180mC-114
- 3M™ Print Wrap Film IJ180mC-120
- 3M™ Envision™ Print Wrap Film LX480mC
- 3M™ Envision™ Print Wrap Film SV480mC

Recommended Graphic Protection

- 3M™ Scotchcal™ Gloss Overlaminate 8518
- 3M™ Scotchcal™ Luster Overlaminate 8519
- 3M™ Scotchcal™ Matte Overlaminate 8520
- 3M™ Scotchcal™ Gloss Overlaminate 8528
- 3M™ Envision™ Gloss Wrap Overlaminate 8548G
- 3M™ Envision™ Luster Wrap Overlaminate 8549L
- 3M™ Envision™ Matte Wrap Overlaminate 8550M

Applying Film to Contoured Surfaces of Watercraft

Covering complex curves and contours requires special techniques, including heating and stretching film. The specific characteristics of a film and the inks with which it is printed, as well as whether the substrate shape is concave or convex, determine how well the film stays bonded to a curved substrate. For watercraft graphics, 3M recommends and warrants only the films listed in the Compatible Product section above. These products are cast films and are less likely to lift from contoured surfaces.

Film has a memory for its original shape. Consequently, stretching the film does result in some shrinkage as it attempts to return to its original dimensions. Installers can expect minor tenting and lifting as the film shrinks. Post-heating the film helps reduce its memory, and thereby tenting and lifting around sharp changes in contour.

Refer to 3M Instruction Bulletin Application: Vehicles for a comprehensive description of application techniques for applying films to recessed areas.

Films with a carbon, brushed, or matte film surface are susceptible to dirt build-up. In addition, due to the films' roughness, it is almost impossible to clean these films. Inform customers of these facts before starting any application involving such films.

Tools

Cleaning Tools and Products

This list of cleaners and tools is provided for the user's convenience. Other acceptable cleaners or tools may be available. 3M does NOT endorse any particular chemical or tool manufacturer or supplier.

Always obtain, read, and observe the information in the appropriate safety data sheet (SDS) for the chemicals used.

- Clean, lint-free paper towels or cloths
- Heat gun
- Good quality liquid soap/detergent, free from waxes, oils, fragrances, or lotions
- A mixture of 70% isopropyl alcohol and 30% water

Solvent-Free General Cleaner and Adhesive Remover

- 3M™ Industrial Cleaner Citrus Base*

Lower Solvent Content Cleaners

- 3M™ Prep Solvent-70, 8983*
- 3M™ Surface Preparation System*

Petroleum Distillate-based Cleaners

- 3M™ General Purpose Adhesive Cleaner*
- DuPont™ Prep-Sol™ Solvent Cleaner 3919S**
- Sherwin Williams R7K156 Sher-Will-Clean™**
- Sherwin Williams R7K158 Sher-Will-Clean™**

* Available from 3M.
** Available from automobile supply houses handling DuPont or Sherwin Williams products.
Listed products may not be available in all regions. Contact 3M Technical Service for a list of alternatives available in local regions.

Application Tools

- 3M™ Plastic Applicator PA-1 (squeegee) with an additional covering such as suede or Teflon tape to allow the squeegee to glide
- 3M™ Air Release Tool 391X
- 3M™ Rivet Brush RBA-1
- 3M™ Rivet Brush RBA-3
- 3M™ Vehicle Channel Applicator Tool VCAT-2
- 3M™ Roller S
- 3M™ Roller L
- 3M™ Tape Primer 94
- 3M™ Edge Tape 8914
- 3M™ Edge Sealer 3950
- 3M™ Knifeless™ Tape
- 3M™ Masking Tape 3434 or 3M™ Masking Tape 2328
- Snap-off cutting knives or razor blades in safety holders
- Industrial heat gun capable of attaining at least 500°F (260°C)
- Infrared thermometer
- Wrap glove

Surface Preparation

All substrates must be considered contaminated. Clean the substrate immediately before applying the film. Dust and other contaminants can collect quickly on the substrate and prevent the film from adhering properly. Even a freshly painted substrate can collect dust before graphics can be applied.

1. Use a solution of 1 oz (30 ml) of a good quality liquid soap/detergent (such as Dawn® or Johnson & Johnson) per gallon (3.78 liters) of lukewarm water to thoroughly clean the watercraft.
   - Avoid soaps or detergents containing waxes, oils, fragrances, or lotions.
   - Chemicals used in some automated washing equipment may prevent good film adhesion.
   - Pay particular attention to cleaning the front and rear of the watercraft, as these areas tend to have more oily residue.
2. Rinse the substrate with clean water.
3. Dry the surface thoroughly with clean, lint-free paper towels. A heat gun may be used to apply moderate heat to accelerate drying.
   - Moisture prevents the adhesive from adhering correctly, can cause bubbles, and can freeze in cold environments. Any moisture trapped beneath the graphic will cause the graphic to fail prematurely.
   - Moisture on the substrate results from:
     - Inadequate drying after cleaning
     - Application solutions
     - Condensation at low temperatures, i.e. < 39°F (4°C)
     - High humidity environments (≥ 60% rH)
4. Clean the surface again with the approved cleaner. Refer to the list of cleaners in the "Cleaning Tools and Products" section on page 3. Ensure the cleaner does not damage the watercraft's paint.

   NOTE

   Test the cleaner on an inconspicuous area of the watercraft to determine if it will damage the substrate.

   Marine wax can greatly reduce graphic adhesion. Solvent-based cleaners must be used to thoroughly remove any wax residue. Alcohol-based cleaners do NOT remove wax effectively.

   a. Saturate a clean paper towel with the approved cleaner.
   b. Clean the substrate with the saturated paper towel.
   c. Wipe off the cleaner with clean lint-free paper towels before it evaporates from the substrate. Discard paper towels as they become dirty. A dirty towel simply moves dirt around, rather than removing it.
   d. Ensure the substrate is completely dry. If necessary, use a heat gun to dry any remaining solvent.
   e. Wipe the surface with a mixture of 70% IPA and 30% water.
   f. Dry the surface with clean paper towels before the IPA mixture evaporates from the substrate.

Pre-Installation Inspection

Installers must complete the 3M Watercraft Graphics Pre-installation Inspection Record before applying film to the watercraft. Failure to obtain a properly executed and signed 3M Pre-installation Inspection Record prior to graphic installation voids all expressed or implied 3M products warranties. It is also a good practice to include pictures pre- and post-installation of the graphics on the watercraft to have references in case of issue or claim.

The record is available in the last two pages of this instruction bulletin.

Application Temperature

Always apply the watercraft graphics when the air and watercraft surface are both above 60°F (16°C) but no more than 90°F (32°C).

Cool Application Conditions

If the temperature is too cool, move the watercraft indoors to bring its surface temperature up to at least the minimum application temperature before starting the installation. Temperature control readings must be done with an infrared thermometer.

Problems occurring when film is installed at temperatures below the recommended minimum application temperature include:

- Film cools too quickly and is unable to maintain the elevated temperatures required for stretching.
- The initial adhesive bond may be insufficient to ensure the film stays adhered.
- Moisture may condense on the watercraft surface if the watercraft's surface temperature is below the dew point.
- In very humid conditions, it may be difficult to keep the substrate dry.

Very Warm Application Conditions

If the temperature is too warm, move the watercraft indoors or into the shade and ensure the watercraft surface cools to below 90°F (32°C) before starting the installation.

Problems occurring when film is installed at temperatures above the recommended maximum application temperature include:

- Graphics may pre-adhere and trap air.
- The adhesive will be more aggressive.
- Controltac™ films may lose their positionability feature.
- The film may stretch too much.

Post-Application Conditions

- All edges must be post-heated and re-squeegeed.
- After applying graphics, keep the watercraft surface temperature above 60°F (16°C) for at least 24 hours before exposing the watercraft to either a cold or wet climate. This strengthens the graphics' bond to the contoured areas.

Application Instructions

Read the full application sequence before starting to apply the graphics.

Remove Body Hardware

1. Remove the rub-rail and as much additional hardware from the watercraft as possible.

Clean the Substrate

NOTE

A clean application surface is critical for a successful graphic installation. Clean the watercraft surface as instructed in this instruction bulletin immediately before applying the film, and apply the film in a clean, dust-free environment.

2. Wash the watercraft according to the instructions in the "Surface Preparation" section on page 4.

Apply 3M™ Knifeless™ Tape to the Body Lines and Wake Ridge

3. Apply 3M™ Knifeless™ Tape Finish Line or Precision Line (depending on the film used) to the edges of all body panels on the watercraft, and at least 1/2 in. (1.3 cm) above the watercraft's wake ridge. See 3M Instruction Bulletin Application: 3M™ Knifeless™ Tape for details on applying 3M™ Knifeless™ Tape.

   Use of 3M™ Knifeless™ Tape is not mandatory, but it is good practice for achieving fast, clean and accurate cuts while minimizing the risk of damage to the watercraft.

Apply 3M™ Tape Primer 94

4. Shake 3M™ Tape Primer 94 well before using.
5. Apply a thin, uniform coat of Primer 94 with a brush to all concave and convex surfaces, around any hardware that could not be removed, and 1/2 in. (1.2 cm) above the wake ridge line of the boat. (See Figure 1.) Use the minimum amount that will fully coat the surface.
6. Allow Primer 94 to dry thoroughly (about five minutes at room temperature).

NOTE

For porous surfaces, a second coat of primer may be required for uniform coverage and good adhesion. Allow the first coat to dry thoroughly before applying a second coat.

7. Apply the film within one hour according to the following instructions.

Figure 1. Wake Ridge

Apply the First Film Panel

Film installations around the entire watercraft require two panels, with seams at the middle of the back of the watercraft (behind the motor) and just off the center of the leading front edge.

8. Cut two horizontal film panels, each at least 8 in. (20 cm) longer than the length of the watercraft.
9. Apply one horizontal film panel (Panel A in Figure 2) to the length of the watercraft, with the film edges extending at least 3 in. (7.6 cm) past the center lines at both the front and rear of the watercraft.
10. Use a squeegee to apply firm, even application pressure to the film. Work in overlapping strokes, and work from the center of the film panel to the nearest edges (on watercraft, this is usually vertically).
11. Puncture any remaining air bubbles with a 3M™ Air Release Tool 391X. Do NOT use a razor blade or knife.
12. Move your thumb across the bubble toward the puncture to push out trapped air. See Figure 3.
13. Post-heat all punctured spots with a heat gun set to 185°F (85°C) in order to seal the holes.

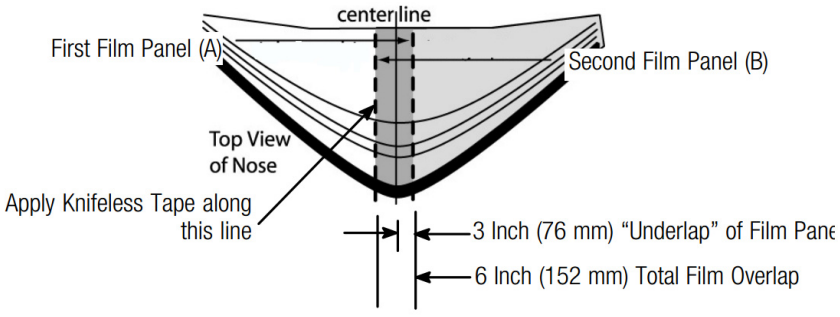

Figure 2. Nose Overlaps

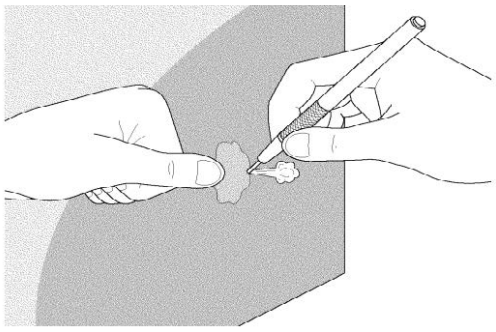

Figure 3. Puncturing and Rubbing Out an Air Bubble

Apply 3M™ Knifeless™ Tape Over the First Film Panel

14. Apply 3M™ Knifeless™ Tape over Panel A, 3 in. (7.6 cm) past the center line onto the film at both the front and rear of the watercraft. See Figure 2.

Apply the Second Film Panel

15. Apply Panel B to the other side of the watercraft, so it fully extends over both segments of 3M™ Knifeless™ Tape. See Figure 2. Apply it with the methods described in Steps 8 through 13.
16. Ensure both film panels are well squeegeed.

Trimming and Cutting the Film

17. Trim Panel B with the 3M™ Knifeless™ Tape. (See 3M Instruction Bulletin Application: 3M™ Knifeless™ Tape for details.)
18. Remove the 3M™ Knifeless™ Tape carrier from underneath the film.
19. Resqueegee the film.
20. Make the wake ridge and body panel 3M™ Knifeless™ Tape cuts.
21. Remove the 3M™ Knifeless™ Tape carrier from underneath the film.

Final Squeegee and Edge Finishing - REQUIRED

22. Re-squeegee all film edges, overlaps, and cuts in channels after finishing cutting.
23. Apply Edge Tape 8914 or Edge Sealer 3950 to these edges. This step is required for warranted watercraft graphics.

Using Edge Tape 8914

a. Apply the tape so it straddles the edge of the film evenly (1/4 in. [6 mm] on the film, and 1/4 in. [6 mm] on the watercraft). See Figure 4.
b. Overlap the corners.
c. Squeegee the film firmly again.

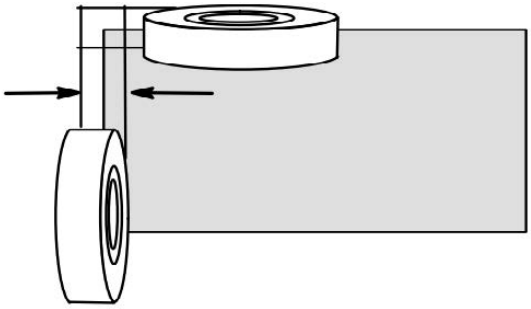

Figure 4. Applying Edge Tape 8914

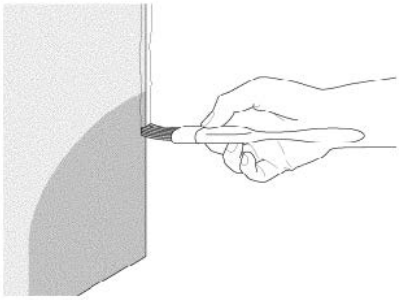

Figure 5. Applying Edge Sealer 3950

Using Edge Sealer 3950

a. Apply the edge sealer with a 1/2 in. (1.3 cm) brush when the substrate temperature is 50°F to 100°F (10°C to 38°C).
b. Hold the brush so it straddles the film and the substrate.
c. Pull the brush along the edge of the film in a smooth, continuous motion. Cover the entire edge length, without leaving any gaps. See Figure 5.
d. Allow Edge Sealer 3950 to dry for 24 hours before putting the graphic into service.

NOTE

Excess edge sealer can be removed using 3M™ Citrus Base Industrial Cleaner.

24. Replace the watercraft's hardware and seal all edges with silicone.
25. Post-heat the entire graphic to 200°F to 225°F (93°C to 107°C) with a heat gun.

NOTE

A torch will not distribute heat evenly enough to sufficiently post-heat the film. Graphics post-heated with a torch are more likely to be burned and/or experience adhesion failure.

NOTE

Post-heating the film reduces internal stress in the film caused by stretching during application. This step is essential for a successful, durable installation. 3M recommends using an infrared thermometer to check the film temperature during post-heating. Hold the thermometer close to the film immediately after heating each section, before the temperature drops.

Removal

Refer to the film's product bulletin for information on its removability. See 3M Instruction Bulletin Removal for additional details on film removal.

3M Related Literature

Read the most current 3M product and instruction bulletins before starting any job.

The information in 3M product and instruction bulletins is subject to change. Current bulletins are available at 3M.com/graphics. The techniques described in these bulletins are required when applying a 3M warranted graphic, but are also practical recommendations when using promotional materials for non-warranted graphics. Additional bulletins may be needed as indicated in the 3M Related Literature sections of the product bulletins of all 3M components used.

- 3M Instruction Bulletin Application: General Installation Techniques
- 3M Instruction Bulletin Application: 3M™ Knifeless™ Tape
- 3M Instruction Bulletin Application: Substrate Selection and Preparation
- 3M Instruction Bulletin Application: Vehicles
  - Consult this document for instructions on applying film to recessed areas of a substrate.
- 3M Instruction Bulletin Maintenance
- 3M Instruction Bulletin Removal

Health and Safety

Tools and Equipment Usage

When using any equipment, always follow the manufacturer's instructions for safe operation.

Chemicals

When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety, and environmental information.

Follow this link to obtain SDS sheets for 3M products.

Follow this link to obtain information about substances of very high concern (SVHC) for EU products.

Air Quality Regulations

Country, state, or regional volatile organic compound (VOC) regulations may prohibit the use of certain chemicals with VOCs in graphic arts coatings and printing operations. Check with local environmental authorities to determine whether use of this product may be restricted or prohibited.

Ergonomics

Any activity performed for a long period of time in an awkward position or with a high amount of force is potentially a risk for causing musculoskeletal strain, pain or injury. When applying or removing graphics, follow these practices to improve comfort and avoid injury:

- Alternate your tasks during the application.
- Schedule regular breaks.
- Perform stretches or do exercises to improve circulation.
- Avoid awkward reaching.

Warranty Information

Technical Information

Technical information, guidance, and other statements provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license to any intellectual property rights is granted or implied with respect to this technical information.

Product Selection and Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment, reviewing all applicable regulations and standards, and reviewing the product label and use instructions. Failure to properly evaluate, select, and use a 3M product in accordance with instructions or to meet all applicable safety regulations may result in injury, sickness, death, and/or harm to property.

Warranty, Limited Remedy, and Disclaimer

Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

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3M Watercraft Graphics Pre-installation Inspection Record

NOTE

Complete both pages of this pre-installation inspection record before each new graphic installation and between subsequent graphic installations on the same watercraft. Use a separate record for each watercraft and installation.

NOTE

For purposes of this bulletin “watercraft” is defined as those personal pleasure vehicles such as runabouts and speedboats having aluminum and/or smooth fiberglass/gel coat bodies, including boats used in fishing tournaments and off-shore racing boats.

Installer Requirements

1. Carefully and thoroughly examine each watercraft and record all potential problem areas prior to installing graphics. 3M recommends washing the watercraft so potential problem areas are more easily seen.
2. Ensure the paint is sound so the graphics will adhere well to the paint. For the purpose of this inspection, “sound paint" is defined as paint that is free of defects (see the “Defects" bullet below). Circle all areas on the following diagram where the inspection finds paint areas that may be unsound, where the graphic may adhere poorly, or where graphic removal may damage the paint. This includes:
   - **Defects:** paint that is not well bonded to the entire application surface, including multiple layers of paint being well bonded to one another; loose paint; dents; surface damage; rough surfaces; and fillers used for damage, rust, or blistered paint.
   - **Areas where water can collect**, which are more likely to rust, resulting in paint adhesion problems.

   NOTE

   Primer, which does not outgas, may be applied to bad paint spots on the watercraft to prepare it for film installation. However, the use of primer on bad paint spots does not guarantee success, provide a warranty, must still be considered a problem area, and must be documented on the pre-installation inspection record. Use of primer on bad paint spots is likely to increase damage to the watercraft surface upon removal of the film.
3. Photograph all areas of the watercraft exhibiting unsound paint.
4. Explain proper graphic maintenance to the watercraft owner/operator. See 3M Instruction Bulletin Maintenance.
5. Complete the 3M Watercraft Graphics Pre-installation Inspection Record.
6. Make and distribute copies of the inspection record to all signing parties.
7. Maintain a file with the signed form and photographs.

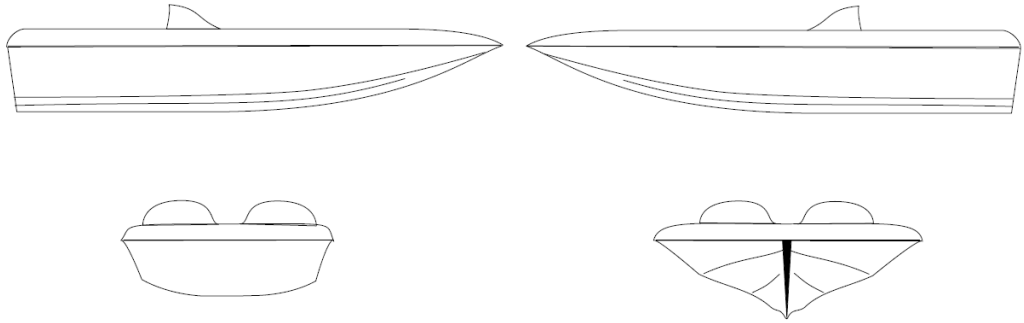
Warranty Claims and Exceptions

1. Failure to obtain a properly executed and signed 3M Watercraft Graphics Pre-installation Inspection Record prior to graphic installation voids all expressed or implied 3M product warranties.
2. If the pre-installation inspection shows the paint is NOT free of defects, the owner of the vehicle waves all expressed or implied 3M product warranties.
3. 3M does NOT warrant watercraft paint staining that may be visible after removing an inkjet printed graphic with an overlaminate. To reduce the risk of this problem, always remove the graphics by the end of the warranty period. See the 3M™ MCS™ Warranty for complete details at www.3Mgraphics.com. 3M makes no warranty (expressed or implied) for paint or existing graphic damage occurring during the removal of a graphic, or for staining that may be visible after removing a graphic. See the 3M Graphics Warranties Bulletin for complete details.
4. To make a claim, contact 3M Commercial Graphics Quality Direct. Be prepared to send in:
   - A piece of the 3M film exhibiting the defect.
   - A properly executed and signed 3M Watercraft Graphics Pre-installation Inspection Record, including any available photographs.

3M Watercraft Graphics Pre-installation Inspection Record

COMPLETE THIS FORM, PROVIDE A COPY FOR EACH SIGNER, AND RETAIN THE ORIGINAL WITH PHOTOGRAPHS IN CASE OF A CLAIM.

Circle all areas where the paint may be unsound. Mark only one watercraft type.



Print except in signature boxes.

Watercraft Owner/Operator
Company Name
Contact Name
Street Address
City/State/Zip
Area Code/Phone Number
Graphics Printer
Company Name
Contact Name
Street Address
City/State/Zip
Area Code/Phone Number
Graphics Installer
Company Name
Contact Name
Street Address
City/State/Zip
Area Code/Phone Number

Watercraft Information	
License Number	State
Watercraft Year, Make, and Model	
HIN	
Watercraft Owner/Operator	
Pre-Inspection: (see the previous page of this bulletin for inspection requirements) ❑ PASSED (DATE: _____ BY: _____) ❑ FAILED (Owner waives all product warranties if graphics are applied)	
Photographs of Potential Problem Areas ❑ YES (DATE: _____ BY: _____) ❑ NO	
Graphic Construction and Installation Information	
Installation Date	
Graphic Coverage ❑ Full ❑ Partial	
Substrate Cleaned and Prepared According to 3M Recommendations: ❑ YES (DATE: _____ BY: _____)	
Film and Graphic Protection Used	
Signatures of All Parties	
Installer	Date
Agency Representative	Date
Watercraft Owner/Operator	Date